COVID-19 Pandemic: Gender difference in satisfaction with a daily supportive text message program (Text4Hope) and anticipated receptivity for technology-based health support during emergencies- Cross Sectional Survey

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Abstract

Background: During the unprecedented time of the COVID-19 pandemic, the need to support mental wellbeing is urgent. In March 2020, Text4Hope was provided as a community health service to Alberta residents. This free service aims to promote psychological resilience and alleviate pandemic-associated stress, anxiety, and depression symptoms.

Objective: This study aimed to evaluate Text4Hope subscribers' experience, satisfaction, and perspectives related to technology-based support during crisis or emergency situations, such as the COVID-19 pandemic, by gender.

Methods: Individuals self-subscribe to Text4Hope to receive daily supportive text messages for three months. Subscribers were invited to complete an online survey at six weeks to collect service satisfaction related information. Overall satisfaction was assessed on a scale from 0 to 10 using the one sample t-test and Likert scale satisfaction responses were used to assess various aspects of the Text4Hope program. Gender differences were measured by using One-Way ANOVA test and Chi-Square analysis.

Results: Overall service satisfaction was high (8.55/10 (SD=1.78) and more than 70% of subscribers agreed that Text4Hope helped them to cope with stress and anxiety, feel connected to a support system, manage COVID-19 related issues, and improve mental wellbeing. Similarly, subscribers agreed that messages were positive, affirmative, and succinct. Messages were read by 97.9% of respondents always or often and more than 20% returned to messages always or often. The majority of subscribers (89.3%) read the messages and either reflected upon them or took a positive action. Subscribers welcomed almost all technology-based services as part of their health care during crisis or emergency situations (70%). Text4Hope was more effective among females, who reported higher satisfaction rates and improved coping after receiving text messages.

Conclusions: Text4Hope successfully captured subscribers' satisfaction and acceptance, during COVID-19 pandemic. Respondents affirmed the high quality of the messages with their positive feedback. Technology-based services can provide remotely accessible, cost-effective, and population-level interventions that align with recommended distancing practices during pandemics. Text4Hope subscriber feedback revealed high satisfaction and acceptance rates after six weeks of receiving daily messages. Clinical Trial: The study protocol was approved by the Research and Ethics Board of the University of Alberta (Pro00086163).

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ABSTRACT

Background: During the unprecedented time of the COVID-19 pandemic, the need to support mental wellbeing is urgent. In March 2020, Text4Hope was provided as a community health service to Alberta residents. This free service aims to promote psychological resilience and alleviate pandemic-associated stress, anxiety, and depression symptoms.

Objective: This study aimed to evaluate the feedback, satisfaction, experience, and perceptions of Text4Hope subscribers, and to examine any differences based on gender after receiving six weeks of daily supportive text messages. Additionally, the study examined anticipated receptivity for technology-based medical services that could be offered during major crises, emergencies, or pandemics, such as COVID-19.

Methods: Individuals self-subscribed to Text4Hope to receive daily supportive text messages for three months. Subscribers were invited to complete an online survey at six weeks to collect service satisfaction related information. Overall satisfaction was assessed on a scale from 0 to 10, using a related-measures t-test; and Likert scale satisfaction responses were used to assess various aspects of the Text4Hope program. Gender differences were analyzed using One-Way ANOVA and Chi-Square analysis.

Results: The total number of subscribers who completed baseline and six-week survey were 2032, 1788 (88.0%) were female, 219 (10.8%) were male, and 25 (1.2%) were other gender. The mean age of study participants was 44.58 (SD=13.45) The mean overall satisfaction score was 8.55/10 (SD=1.78) suggesting that overall, respondents' satisfaction with the Text4Hope program was high. ANOVA analysis, using the Welch test (n=1,716) demonstrated that females had significantly higher mean satisfaction scores, compared to males; 8.65 vs. 8.11, respectively (Mean Difference=0.546, 95% CI=0.19-0.91, $P<.001$), but not to "Other" gender (Mean Difference= -0.938, 95% CI= -0.37-2.25, $P>.05$). More than 70% of subscribers agreed that Text4Hope helped them to cope with stress and anxiety, feel connected to a support system, manage COVID-19 related issues, and improve mental wellbeing. Similarly, subscribers agreed that messages were positive, affirmative, and succinct. Messages were read by 97.9% of respondents always or often and more than 20% returned to messages always or often. The majority of subscribers (89.3%) read the messages and either reflected upon them or took a positive action. Subscribers welcomed almost all technology-based services as part of their health care during crisis or emergency situations (70%). Text4Hope was perceived to be more effective by subscribers identifying as female, who reported higher satisfaction and improved coping after receiving messages for 6 weeks.

Conclusions: Respondents affirmed the high quality of the messages with their positive feedback. Technology-based services can provide remotely accessible and population-level interventions that align with recommended distancing practices during pandemics. Text4Hope subscriber feedback revealed high satisfaction and acceptance rates after six weeks of receiving daily messages.

Key Words: COVID-19; Text4Hope; satisfaction; mobile phones; text; anxiety; depression; stress,

pandemic; e-mental health; gender.

INTRODUCTION

Background

On March 11, 2020, the World Health Organization (WHO) declared coronavirus disease (COVID-19) a global pandemic [1]. By March 23, 2020, there were 332,930 COVID-19 cases world-wide, and 14,509 deaths attributed to the pandemic [2]. On this date, Alberta Health Services (AHS), the Provincial Health Authority in Alberta, Canada, launched Text4Hope, a free mobile community mental health service aimed to support mental wellbeing and resilience, improve coping mechanisms, and safeguard against pandemic-associated thoughts in Alberta residents [3]. The service was advertised on the AHS and the Text4Hope funders websites and was launched on March 23, 2020. Thousands of people signed up for the service and enrollment continues to increase to date. Text4Hope is a text-based mental health support program comprised of daily evidence-based cognitive behavioural therapy (CBT)-derived text messages. These messages were carefully designed to accompany a rapidly evolving health crisis, to be scalable, remotely delivered, accessible, and to be cost-effective for funding organizations and free to subscribers [4]. The Text4Hope program was developed based on lessons from the Text4Mood and Text4Support programs [5, 6]. Similar to the Text4Mood program, with Text4Hope, individual self-subscribes receive daily text messages. Whilst the Text4Mood messages were crafted to address mostly anxiety, depression and general wellbeing among residents of Northern Alberta, the Text4Hope messages were crafted to address predominantly COVID-19 related stress, anxiety and depression amongst all Albertans. In contrast to both Text4Mood and Teat4Hope, Text4Support is specifically designed to provide support for the eight most common Addiction and Mental Health concerns seen in the Edmonton Zone [6]. Additionally, it is a mental health therapist or psychiatrist that refers the clients into one of the eight categories and patients are enrolled by a coordinator inputting the patients' number into an online program. Text4Hope fills a service gap in Alberta as social distancing measures may mean that that individuals at high risk from the health perspective, may not have been able to access addiction and mental health services during the early stage and it offers mental health support for those who might not feel comfortable about in-person contact.

During similar crises, effective and efficient mobilization of community resources has been strongly encouraged to support and properly meet mental health needs and avoid future adverse mental health consequences [7]. During pandemics, negative thoughts accompanied by growing uncertainties can pose a threat to personal health and mental wellbeing. Transmissibility of COVID-19 has been shown to exceed similar viruses (e.g., Middle East Respiratory Syndrome-CoV, H1N1, and SARS-

CoV) [8]. As such, strict policies and regulations were enforced to contain viral spread, including physical distancing, self-isolation, quarantine, travel restrictions, closure of public schools, and disinfection protocols, which are likely contributing to mental strain and psychological distress, during this pandemic [9, 10]. Other iterations of texting programs were undertaken to support patients with major depressive disorders [11] and alcohol use disorder [12, 13]. Individuals in these programs reported an improvement in depression scores and felt better-supported to quit drinking alcohol after receiving text messages [12, 14]. Supportive texting messaging services can be tailored to meet the needs of diverse populations. For example, Text4baby and Quit4baby are two services provided for pregnant women in the United States [15, 16] , while Text4Mood and Text4Support are mental health services provided to people in Canada [5, 6] Ultimately, such services provide people with hopefulness and support, aiming to close the psychological treatment gap experienced in healthcare systems [5].

To make best use of resources and enhance the use of texting technology as part of routine practice in healthcare, it is essential to assess user satisfaction and better understand subscribers' experiences. Assessment of user satisfaction is a quality tool that affects client retention and the clinical outcomes [17]. In industry, relative satisfaction and customer expectations are considered critical components to guarantee customer loyalty [18]. In healthcare systems, self-reported continuity of care was strongly correlated with client satisfaction, where one recent study demonstrated that a 7.2% reduction in reporting "at least good overall satisfaction" was associated with a 1% increase in hospital bed occupancy [17]. Generally, asynchronous online and text-based services are accepted by an increasing number of individuals who perceive such services as supportive and promising [19]. Most of these programs usually state that more than 85% of text recipients report satisfaction, convenience, easy use, and a better control of life activities, while above 90% report increased life productivity after receiving texts [20, 21]. Additionally, telephone services are frequently associated with lower attrition rates than face-to-face services, likely due to accessibility afforded by technology that removes geographical barriers, especially for those who are tentative about seeking medical attention or require medications [22]. Agyapong and colleagues, who evaluated Text4Mood, found that 80% of participants agreed that asynchronous supportive text messages should be provided for follow-up care, compared to approximately 50% of participants that agreed to the use of video-conferencing consultations [5]. A number of variables may affect user satisfaction with texting services, such as sociodemographic characteristics, health status, and disease severity. Similarly, one's gender identity may be an important determinant of service acceptability and satisfaction,

although it is notable that inconsistent findings have been reported for gender identity effects. While females showed a high acceptability and desirability to respond to surveys that were conveyed to them via texting service [23], in a feasibility study, a high fidelity of texting service program was also reported when provided to a group of disadvantaged men at risk of substance or alcohol abuse[24]. In yet another study, authors found no difference between male and female university students regarding their satisfaction with texting services for alcohol use intervention [14]. Additionally, the initial reports of our program revealed that a majority of our subscribers reported their gender as female (86.9%). This overrepresentation of female gender necessitated investigations into user satisfaction and anticipated agreement to receive technology-based medical services based on gender so that targeted gender-based intervention can be developed in accordance with user preferences. This study occurred in Alberta, a Canadian Province where the Text4Hope program was launched. As of July 1st, 2020, Alberta's population was 4,421,876, with 68% of the population aged between 15 to 64 years. Alberta has consistently been home to more males than females (101 males per 100 females), mainly due to the large proportion of working-age males migrating to the province [25]. In 2006, the racial and ethnic composition of Alberta was 80.3% white, 13.9% belonging to a visible minority group and 5.8% Aboriginal (3% First Nations, 2.6% Metis, 0.1% other Aboriginal). Visible minority groups include: Chinese (3.7%), South Asian (3.2%), Filipino (1.6%), Black (1.4%), Southeast Asian (0.9%), Latin American (0.8%), Arab (0.8%), Korean (0.4%), West Asian (0.3%) and Japanese 0.3% [26]. In 2016, more than half (54.0%) of Canadians aged 25 to 64 had either college or university qualifications, up from 48.3% in 2006 [27]. Alberta's Gross Domestic Product at basic prices was $334.5 billion in 2019, largely unchanged from 2018 [28].

Objective

The aim of this study was to evaluate the overall satisfaction with Text4Hope, obtain feedback about the experiences and impact of the texting intervention, explore perceptions of subscribers about their anticipated receptivity towards diverse technology-based medical services offered as a part of their healthcare during major crises, emergencies, or pandemics, such as COVID-19, and to examine any differences based on gender after receiving six weeks of daily supportive text messages.

Hypotheses

Based on previous Text4Mood research [5], our hypotheses were: (1) the mean overall satisfaction level with Text4Hope would be at least 7.5 (75%) (2) at least 75% of subscribers will express anticipated agreement with receiving diverse technology-based medical services during crises or

emergencies. Additionally, there would be a difference in the satisfaction measure based on the self-declared gender identity of the respondents.

METHOD

This cross-sectional study assessed subscriber satisfaction and experience with Text4Hope and perceptions of technology-based support after six-weeks of receiving the daily texts.

The data collection methods have been fully described in the study protocol [29].

In summary, subscribers join the Text4Hope program [3] and receive daily supportive text messages for three months by texting the word “COVID19HOPE” to a short code number. The messages are aligned with a cognitive behavioural framework that address aspects of potential stresses, anxiety and depression, and content was written by mental health professionals. Text message delivery was unidirectional and not specifically tailored to the end users. The following are examples of the messages sent:

- *“When bad things happen that we can’t control, we often focus on the things we can’t change. Focus on what you can control; what you can do to help yourself (or someone else) today”*.
- “What lies behind you and what lies before you are tiny matters compared to what lies within you. Have faith in yourself and success can be yours”.
- “Set goals for today, even if they are small. Goals should be “SMART”: Specific, Measurable, Achievable, Realistic, and Timely”.

The messages were uploaded to an online platform, which delivered automated messages at 9:00 a.m. The first message welcomed subscribers to the service and invited them to voluntarily complete an online baseline survey to capture demographic and clinical information, pertaining primarily to anxiety, stress, depression, and self-isolation. At six weeks, subscribers were invited again, via a text message link, to complete a follow-up survey online.

The six-week survey included standardized scales used for the Text4Hope baseline assessments [30, 31] as well as an adopted version of the Text4Mood user satisfaction survey [5]. Each survey takes 5-10 minutes to complete. No incentives were offered to respondents for completing the baseline or six-week surveys. Consent was implied if participants clicked on survey links and submitted their responses.

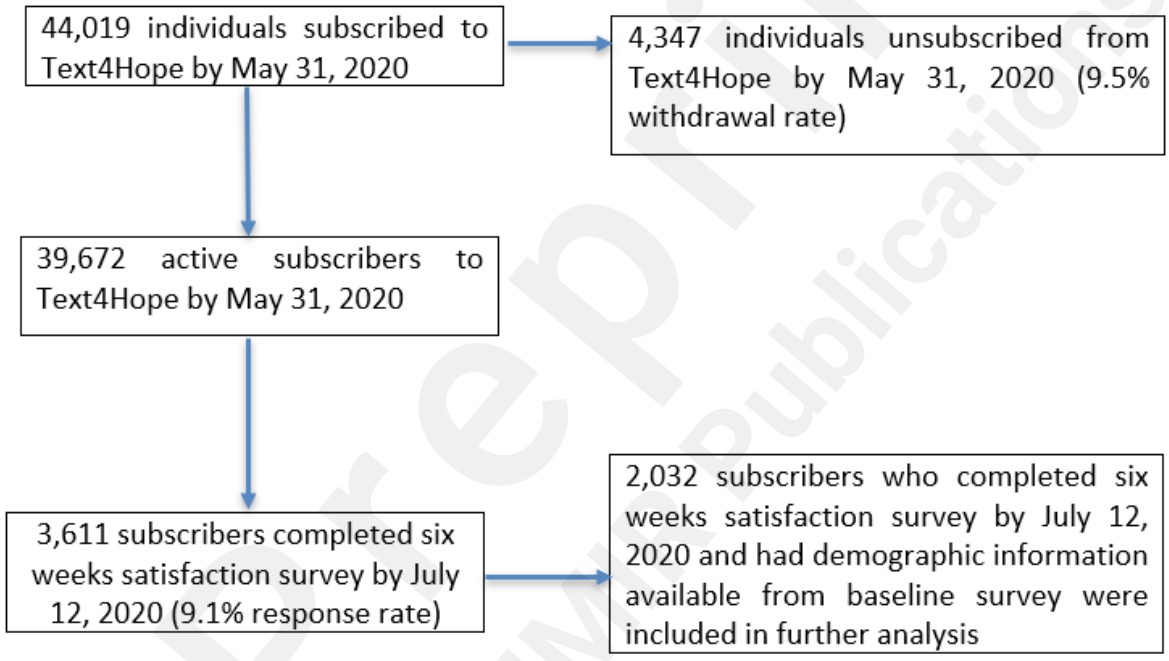
Participation in the program was voluntary and receipt of supportive text messages was not contingent on survey completion. Subscribers could opt-out of Text4Hope at any time by texting

"STOP" to a short code number.

Six-week satisfaction data were collected between May 31 and July 12, 2020. Figure 1 is the subscriber flow chart which indicates the number of subscribers completing the online surveys at each time point.

The study protocol [29] was approved by the Research and Ethics Board of the University of Alberta (Pro00086163).

Figure 1: Subscriber flowchart



Outcome Measures

The primary outcome measure was subscribers' overall satisfaction with the Text4Hope daily supportive text messages, based on an 11-point Likert scale (0 being very dissatisfied, 5 being neither satisfied nor dissatisfied and 10 being very satisfied) at six weeks. This overall satisfaction score lets us know whether people like texting-based services. If people are satisfied with the services they receive, that indicates potential as a feasible population-based service for future service planning during pandemics. The satisfaction scale has been used to compare service satisfaction across all Addiction & Mental Health Services in the Edmonton Zone. The reliability/validity of this scale has not been tested, although it has been in use for several years.

Secondary outcomes included perceived impacts and feedback from subscribers regarding the daily supportive text messages at six weeks, as well as subscribers' anticipated receptivity to diverse technology-based medical services (i.e., telephone, video conferencing, email, etc. for healthcare) during the COVID-19 pandemic. Gender differences in both primary and secondary measures constituted an exploratory outcome measure.

Sample size considerations

With 44019 individuals subscribing to Text4Hope by May 31, 2020, we estimated that a sample size of 1775 was needed to estimate the overall mean satisfaction rate on an 11-point scale (from 0 to10) for the entire population with a 3 % margin of error and 99% confidence.

Analysis

Data were analyzed using the IBM Statistical Package for Social Sciences (SPSS) Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA) [32]. Demographic characteristics were summarised as raw numbers and percentages. We compared subscriber overall satisfaction on an 11-point Likert scale (0 being very dissatisfied, 5 being neither satisfied nor dissatisfied and 10 being very satisfied), and analysed responses using the related-sample t-test. We explored gender differences in satisfaction on this same scale using One-Way ANOVA. A two-tailed criterion with Bonferroni correction (α <0.002) was used to determine statistical differences. Likert scale satisfaction responses to various aspects of Text4Hope, anticipated receptivity for technology-based interventions (Web-based counselling, telephone counselling, text/email messaging, telephone consultations for physical and mental health, and video consultations for physical and mental health) were summarized as frequency counts of response categories and percentages. We compared gender differences in satisfaction and preferences for technology-based interventions using Fisher's Exact Test with a two tailed Bonferroni corrected two tailed criteria for 23 variables (α<0.002) to determine statistical differences. There was no imputation for missing data and the results were based on completed survey responses.

Between May 31 and July 12, 2020, 39672 active Text4Hope subscribers were invited to complete the six-week survey, of which 3,611 completed the survey yielding a response rate of 9.1%. Of the 2032 subscribers for whom demographic information was available from their baseline survey and included in further analysis, 1788 (88.0%) were female, 219 (10.8%) were male, and 25 (1.2%)

indicated other gender. Table 1 provides a descriptive analysis of the demographics of respondents.

RESULTS

Table 1 displays demographic characteristics based on different genders. The data indicate that most respondents were aged between 26 and 60 years (77.6%, n=1555), Caucasian (83.5%, n=1688), were married, cohabiting, or partnered (65.5%, n=1110), reported completion of post-secondary education (89.9%, n=1523), were employed (70.9%, 1191), and owned their own home (69.8%, n=1171).

Table 1: Demographic and clinical characteristics of respondents at six weeks

Variables	Male (219) N (%)	Female (1788) N (%)	Other Gender (25) N (%)	Overall (2032) N (%)
Age (Years)				
≤25	15 (7.0)	151 (8.6)	7 (28.0)	173 (8.6)
26-40	53 (24.8)	490 (27.7)	12 (48.0)	555 (27.7)
41-60	105 (49.1)	891 (50.5)	4 (16.0)	1000 (49.9)
>60	41 (19.2)	234 (13.3)	2 (8.0)	277 (13.8)
Ethnicity				
Caucasian	177 (81.2)	1492 (83.9)	19 (76.0)	1688 (83.5)
Indigenous	6 (2.8)	54 (3.0)	0 (0.0)	60 (3.0)
Asian	15 (6.9)	90 (5.1)	1 (4.0)	106 (5.2)
Other	20 (9.2)	142 (8.0)	5 (20.0)	167 (8.3)
Education				
Less than High School	7 (4.0)	35 (2.3)	2 (8.7)	44 (2.6)
Diploma	14 (8.0)	102 (6.8)	1 (4.3)	117 (6.9)
High School Diploma	155 (88.1)	1349 (90.2)	19 (82.6)	1523 (89.9)
Post-Secondary Education	0 (0.0)	9 (0.6)	1 (4.3)	10 (0.6)
Other Education				
Employment status				
Employed	120 (69.0)	1059 (71.5)	12 (52.2)	1191 (70.9)
Unemployed	26 (14.9	177 (11.9)	3 (13.0)	206 (12.3)
Retired	23 (13.2)	151 (10.2)	2 (8.7)	176 (10.5)
Students	4 (2.3)	71 (4.8)	5 (21.7)	80 (4.8)
Other	1 (0.6)	24 (1.6)	1 (4.3)	26 (1.5)
Relationship status				
Married/Cohabiting/	112 (63.3)	987 (66.0)	11 (47.8)	1110 (65.5)
Partnered	14 (7.9)	154 (10.3)	1 (4.3)	169 (10.0)
Separated/Divorced	3 (1.7)	37 (2.5)	1 (4.3)	41 (2.4)
Widowed	46 (26.0	303 (20.3)	9 (39.1)	358 (21.1)
Single	2 (1.1)	14 (0.9)	1 (4.3)	17 (1.0)
Other				
Housing status				
Own Home	122 (69.7)	1037 (70.1)	12 (52.2)	1171 (69.8)

Living with Family	14 (8.0)	132 (8.9)	4 (17.4)	150 (8.9)
Renting	38 (21.7	300 (20.3)	5 (21.7)	343 (20.5)
Other	1 (0.6)	10 (0.7)	2 (8.7)	13 (0.8)

Primary outcome measure

Respondents were asked to rate their overall satisfaction with the daily supportive text message (Text4Hope) service on a scale of 0 to 10, where 0 represented very dissatisfied, 5 represented neither satisfied nor dissatisfied, and 10 represented very satisfied. The mean score recorded by 2,940 respondents was 8.55 (SD=1.78) suggesting that overall, respondents' satisfaction with the Text4Hope program was high. ANOVA analysis, using the Welch test (n=1,716) demonstrated that females had significantly higher mean satisfaction scores, compared to males; 8.65 vs. 8.11, respectively (Mean Difference=0.546, 95% CI=0.19-0.91, $p<0.001$), but not to "Other" gender (Mean Difference= -0.938, 95% CI= -0.37-2.25, $p>.05$).

Secondary outcome measures

In Table 2, we explored subscribers' level of agreement regarding Text4Hope benefits. This table displays perceived impact of the subscribers after receiving daily text messages for six weeks.

Table 2: Gender differences of the perceived impact of daily messages at six weeks

The daily messages from Text4Hope have helped me...	Male N (%)	Female N (%)	Other N (%)	*P*-value [a]	Total N (%)
To cope with stress related to COVID-19					
Agree	144 (75.8)	1177 (77.4)	13 (61.9)	.05	1334 (77.1)
Neutral	33 (17.4)	284 (18.7)	5 (23.8)		322 (18.6)
Disagree	13 (6.8)	59 (3.9)	3 (14.3)		75 (4.3)
To cope with anxiety related to COVID-19					
Agree	133 (70.4)	1162 (76.5)	14 (66.7)	.05	1309 (75.8)
Neutral	44 (23.3)	297 (19.6)	4 (19.0)		345 (20.0)
Disagree	12 (6.3)	59 (3.9)	3 (14.3)		74 (4.3)
To cope with depression related to COVID-19					
Agree	103 (54.5)	856 (56.4)	9 (42.9)	.04	968 (56.1)
Neutral	63 (33.3)	561 (37.0)	9 (42.9)		633 (36.7)
Disagree	23 (12.2)	100 (6.6)	3 (14.3)		126 (7.3)
To cope with loneliness related to COVID-19					

Agree	71 (37.4)	757 (49.9)	9 (42.9)	.01	837 (48.5)
Neutral	85 (44.7)	592 (39.1)	9 (42.9)		686 (39.7)
Disagree	34 (17.9)	167 (11.0)	3 (14.3)		204 (11.8)
Feel connected to a support system during COVID-19					
Agree	144 (75.8)	1242 (81.8)	14 (66.7)	.05	1400 (81.0)
Neutral	33 (17.4)	211 (13.9)	4 (19.0)		248 (14.3)
Disagree	13 (6.8)	65 (4.3)	3 (14.3)		81 (4.7)
Feel hopeful I can manage issues related to COVID-19					
Agree	134 (70.5)	1133 (74.7)	12 (57.1)	.09	1279 (74.0)
Neutral	46 (24.2)	324 (21.4)	6 (28.6)		376 (21.8)
Disagree	10 (5.3)	60 (4.0)	3 (14.3)		73 (4.2)
Improve my overall mental wellbeing					
Agree	136 (71.6)	1159 (76.2)	13 (61.9)	.06	1308 (75.6)
Neutral	38 (20.0)	289 (19.0)	5 (23.8)		332 (19.2)
Disagree	16 (8.4)	72 (4.7)	3 (14.3)		91 (5.3)
Enhancing my quality of life					
Agree	104 (55.0)	941 (62.5)	12 (60.0)	.11	1057 (61.7)
Neutral	68 (36.0)	474 (31.5)	5 (25.0)		547 (31.9)
Disagree	17 (9.0)	90 (6.0)	3 (15.0)		110 (6.4)

[a]*Bonferroni corrected two tailed criteria for significance (α<0.002)*

The results in this table indicate that three quarters of respondents agreed that the daily text messages helped them cope with stress and anxiety as well as manage COVID-19 related issues, while about half of respondents indicated the messages helped them cope with depression and loneliness. About eight out of ten respondents agreed that they felt connected to a support system through receiving the daily messages, a little over seven out of ten respondents indicated that the daily messages helped to improve their mental wellbeing while about six out of ten respondents indicated that the daily messages helped to enhance their quality of life. Overall, a higher proportion of females agreed with all Text4Hope benefits compared with males and other gender identities; however, there were no statistically significant gender differences in the levels of agreement expressed for all areas assessed.

Table 3 describes subscribers' opinions about Text4Hope messages after six weeks. The data indicate that about three quarters of respondents always found the Text4Hope text messages to be positive, affirmative, and succinct. More than eight out of ten respondents (n=1505, 87.4%) indicated that the messages were always or often relevant. Again, a higher proportion of females reported they found the messages always positive, affirmative, succinct, and relevant. Post hoc analysis with z-scores

revealed that a significantly higher proportion of females reported they found the messages always positive, affirmative, and relevant (p< 0.001 for each comparison).

Table 3: Gender differences in the feedback about Text4Hope messages at six weeks

The Text4Hope text messages were...	Male N (%)	Female N (%)	Other N (%)	*P*-value[a]	Total N (%)
Positive					
Always	131 (68.9)	1193 (78.4)	12 (57.1)	<.001[a]	1336 (77.1)
Often	55 (28.9)	291 (19.1)	6 (28.6)		352 (20.3)
Sometimes	3 (1.6)	35 (2.3)	2 (9.5)		40 (2.3)
Rarely	1 (0.5)	2 (0.1)	1 (4.8)		4 (0.2)
Never	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)
Affirmative					
Always	118 (62.8)	1104 (72.7)	9 (42.9)	<.001[a]	1231 (71.3)
Often	57 (30.3)	347 (22.9)	10 (47.6)		414 (24.0)
Sometimes	11 (5.9)	58 (3.8)	1 (4.8)		70 (4.1)
Rarely	1 (0.5)	8 (0.5)	0 (0.0)		9 (0.5)
Never	1 (0.5)	1 (0.1)	1 (4.8)		3 (0.2)
Succinct					
Always	128 (67.7)	1114 (73.7)	12 (57.1)	.09	1254 (72.8)
Often	49 (25.9)	300 (19.8)	5 (23.8)		354 (20.6)
Sometimes	12 (6.3)	92 (6.1)	4 (19.0)		108 (6.3)
Rarely	0 (0.0)	6 (0.4)	0 (0.0)		6 (0.3)
Never	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)
Relevant					
Always	95 (50.5)	945 (62.4)	12 (57.1)	<.001[a]	1052 (61.1)
Often	64 (34.0)	386 (25.5)	3 (14.3)		453 (26.3)
Sometimes	20 (10.6)	163 (10.8)	3 (14.3)		186 (10.8)
Rarely	7 (3.7)	19 (1.3)	2 (9.5)		28 (1.6)
Never	2 (1.1)	1 (0.1)	1 (4.8)		4 (0.2)
Frequency of reading messages					
Always	161 (84.7)	1351 (89.8)	19 (90.5)	.61	1531 (89.2)
Often	23 (12.1)	125 (8.3)	2 (9.5)		150 (8.7)
Sometimes	5 (2.6)	25 (1.7)	0 (0.0)		30 (1.7)
Rarely	1 (0.5)	2 (0.1)	0 (0.0)		3 (0.2)
Never	0 (0.0)	2 (0.1)	0 (0.0)		2 (0.1)
Returned to messages					
Always	7 (3.7)	73 (4.9)	0 (0.0)	.47	80 (4.7)
Often	33 (17.4)	287 (19.1)	1 (4.8)		321 (18.7)
Sometimes	76 (40.0)	635 (42.2)	13 (61.9)		724 (42.2)

Rarely	46 (24.2)	327 (21.7)	4 (19.0)		377 (22.0)
Never	28 (14.7)	183 (12.2)	3 (14.3)		214 (12.5)
Actions taken after reading text messages					
Read text and took a positive or beneficial action	14 (7.7)	186 (12.7)	1 (5.0)	.003	201 (12.1)
Read text and reflected on the messages	138 (75.4)	1119 (76.5)	13 (65.0)		1270 (76.2)
Read the text and took no action	25 (13.7)	138 (9.4)	6 (30.0)		169 (10.1)
Read text and took a negative or harmful action	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)
Did not read the text	2 (1.1)	2 (0.1)	0 (0.0)		4 (0.2)
Other	4 (2.2)	18 (1.2)	0 (0.0)		22 (1.3)

[a]*Bonferroni corrected two tailed criteria for significance (α<0.002)*

Most respondents (n=1531, 89.2%) indicated they always read the messages, and about two out of ten respondents indicated they always or often return to read the messages (N=401, 23.4%). Neither factor indicated gender differences on analysis. Table 3 data indicated that slightly more than seven out of ten respondents (n=1270, 76.2%) indicated they read the text and reflected on the message while one in ten respondents indicated they took positive or beneficial actions after reading the messages. A non-statistically significant trend was noted for a higher proportion of females indicating they read the text and reflected on the message as well as took positive or beneficial actions after reading the messages. No subscriber indicated they read the messages and took a negative action.

We explored subscriber anticipated receptivity to diverse technology-based services as part of their health care during crisis or emergency situations such as the COVID-19 pandemic. The results displayed in Table 4 suggest that at least eight out of ten respondents agreed with receiving web-based counselling, telephone counselling, and text messaging as part of their health care during any crisis or emergency situation such as the COVID-19 pandemic. There were no gender differences in respondent preferences for web-based counselling, telephone counselling, and text messaging as part of their health care during any crisis or emergency situations. Similarly, about seven out of ten respondents were agreed on receiving consultations via video and telephone for both physical and mental health care during any crisis or emergency situation such as the COVID-19 pandemic with no gender-based differences in expressed preferences. Finally, about six out of ten respondents agreed

on receiving email messages as part of their health care during a crisis or emergency situation such as the COVID-19 pandemic. A higher proportion of respondents who selected other gender agreed on receiving email messages as part of their health care during a crisis or emergency situation compared to subscribers who selected female and male gender.

Table 4: Anticipated receptivity of subscribers to diverse technology-based services as part of their health care during crisis or emergency situations such as the COVID-19 pandemic

In a crisis or emergency situation such as COVID-19, I would welcome the following technology-based services as part of my health care.	**Male N (%)**	**Female N (%)**	**Other N (%)**	***P*-value[a]**	**Total N (%)**
Web based counselling for stress, anxiety, and depression.					
Agree	152 (80.9)	1220 (83.3)	18 (85.7)	.55	1390 (83.0)
Neutral	26 (13.8)	198 (13.5)	3 (14.3)		227 (13.6)
Disagree	10 (5.3)	47 (3.2)	0 (0.0)		57 (3.4)
Telephone counselling for stress, anxiety, and depression.					
Agree	151 (80.3)	1176 (80.4)	19 (90.5)	.80	1346 (80.5)
Neutral	29 (15.4)	229 (15.7)	2 (9.5)		260 (15.6)
Disagree	8 (4.3)	58 (4.0)	0 (0.0)		66 (3.9)
Text messaging for stress, anxiety, and depression.					
Agree	159 (84.6)	1288 (88.2)	18 (85.7)	.12	1465 (87.8)
Neutral	19 (10.1)	132 (9.0)	1 (4.8)		152 (9.1)
Disagree	10 (5.3)	40 (2.7)	2 (9.5)		52 (3.1)
Email messaging for stress, anxiety, and depression.					
Agree	106 (56.7)	962 (65.8)	16 (76.2)	.01	1084 (64.9)
Neutral	45 (24.1)	345 (23.6)	4 (19.0)		394 (23.6)
Disagree	36 (19.3)	154 (10.5)	1 (4.8)		191 (11.4)
Mental health video consultation					
Agree	132 (70.2)	1094 (74.7)	18 (85.7)	.29	1244 (74.3)
Neutral	42 (22.3)	284 (19.4)	1 (4.8)		327 (19.5)
Disagree	14 (7.4)	87 (5.9)	2 (9.5)		103 (6.2)
Physical health video consultation					
Agree	119 (63.3)	1055 (72.0)	16 (76.2)	.12	1190 (71.1)
Neutral	50 (26.6)	279 (19.0)	4 (19.0)		333 (19.9)
Disagree	19 (10.1)	131 (8.9)	1 (4.8)		151 (9.0)
Mental health telephone consultation					

Agree	126 (67.4)	1102 (75.4)	17 (81.0)	.19	1245 (74.6)
Neutral	44 (23.5)	259 (17.7)	3 (14.3)		306 (18.3)
Disagree	17 (9.1)	100 (6.8)	1 (4.8)		118 (7.1)
Physical health telephone consultation					
Agree	124 (66.3)	1052 (72.2)	17 (81.0)	.30	1193 (71.7)
Neutral	44 (23.5)	258 (17.7)	3 (14.3)		305 (18.3)
Disagree	19 (10.2)	147 (10.1)	1 (4.8)		167 (10.0)

[a]*Bonferroni corrected two tailed criteria for significance (α<.002)*

DISCUSSION

This study provided results of subscribers' satisfaction with Text4Hope, after receiving the texting intervention for six weeks. Our results revealed considerable satisfaction related to Text4Hope. The total number of subscribers who completed baseline and six-week survey were 2032 with a self-identified female majority. The mean age of study participants was 44.58. Overall service satisfaction was perceived as high and more than 70% of subscribers agreed that Text4Hope helped them to cope with stress and anxiety, feel connected to a support system, manage COVID-19 related issues, and improve mental wellbeing. Similarly, subscribers agreed that messages were positive, affirmative, and succinct. Messages were read by 97.9% of respondents always or often and more than 20% returned to messages always or often. Most subscribers read the messages and either reflected upon them or took a positive action. Subscribers welcomed almost all technology-based services as part of their health care during crisis or emergency situations (70%). Text4Hope was perceived to be more effective by female subscribers. The withdrawal rate for Text4Hope was approximately 10% at six weeks. Untailored and unilateral texting services often have high withdrawal rates ranging from 0 - 57% [14, 33]. Additionally, prior studies report that withdrawal rate may be higher in people who receive interventions via SMS compared to people who receive the same intervention via email [14]. In a review of 93 mental health apps targeting anxiety, depression, or emotional well-being, the medians of app 15-day and 30-day retention rates were only 3.9% (IQR 10.3%) and 3.3% (IQR 6.2%), respectively [34]. It is possible that ourText4Hope program achieved a higher retention rate compared to other mental health apps because it is unidirectional and requires no additional effort or action on the part of the subscriber following enrolment. It is also possible that the message content, crafted by mental health professionals, the high anxiety, stress and depression levels experienced by the population level due to the COVID pandemic and the reduced availability of face-to face services contributed to the high Text4Hope retention rate.

Female respondents comprised the majority in our study (88%). In other texting-based services, females were also highly represented (>80% of participants) [5]. There were obvious gender differences in subscriber satisfaction rates for Text4Hope. In another study in which 240 university students received fully automated multiple-session alcohol Intervention, the majority of which were satisfied with the content and length of the texts, no gender-based differences in responses were reported [14].

Overall, satisfaction with our provided service (8.55/10) was high, in accord with 95% satisfaction results of the Text4Mood program reported by Agyapong et al [5]. Similar findings were reported in a review of text message use in a mental health population [35]. Bendsten & Bendsten previously reported on participant satisfaction, which ranged from 57.9% to 84.6%, in relation to the frequency, content, and length of messages [14]. Our study results indicate that females are generally more satisfied overall with the program compared to males. Generally, the relationship between user satisfaction with health service and self-reported gender seems inconclusive. In a systematic review of 39 studies, the majority of the studies (66.7%) showed no significant relationship, and the rest were nearly equally divided in favour of either males or females [36].

Level of self-reported ability to cope with psychiatric burdens was mostly lower for Text4Hope respondents than that reported for the Text4Mood by Agyapong et al [5]; this was true for both depression (56.1% vs. 76.7%) and loneliness (48.5% vs. 57%), while the results were consistent in relation to coping with stress symptoms (77.1% vs. 77.2%). This difference could be attributed to the unprecedented experience of the COVID-19 pandemic and associated distress and/or the strict restrictions (e.g., self-isolation, quarantine) which may be perceived as limiting personal freedom and activity and may contribute to feelings of loneliness. Similarly, while the perceived improvement in quality-of-life score was positive for more than half of our respondents, it was about 14% lower than the prior results of Agyapong et al [5]. This may reflect potentially higher negative and multi-focal impacts of the COVID-19 pandemic on people's perceived quality of life. In addition, females reported more satisfaction with the Text4Hope program with respect to help with coping with loneliness and depression. This may be aligned with the view that depressive symptoms are more frequently experienced among females [37], alongside the fact that people are usually more willing to participate in research that is personally related to their condition or disease under study [38]. Text4Hope, therefore, seems to be a useful support that helps to ameliorate distressing symptoms in this differentially affected group.

More than seven out of ten people in our study reported that the messages were always positive, affirmative, and succinct. About six in ten reported that the messages were relevant.. These proportions were higher in females, who are usually satisfied with texting services and perceive and interact actively with these messages [19]. Our rates were higher than the rates reported by Agyapong, et al, which ranged from 45.1% to 60% [5]. Similarly, feeling connected to the healthcare system gained a higher positive response, compared to Agyapong et al, (81.0% vs. 75.2%, respectively) [5]. The latter result may reflect the true need of Alberta residents to connect to a healthcare system, in light of the absence of regular, conventional care provided before the COVID-19 pandemic, and given that all subscribers were actively seeking help through the texting program.

Text4Hope respondents reported reading the text messages always or often at a similar rate to Agyapong, et al 2016 [5] and higher than Agyapong, et al, 2013 (84%) [39]. Additionally, our subscribers reported always/often to returning to the Text4Hope messages, with more than half of the respondents have returned to the messages, either always, often, or sometimes. This is fairly comparable to Agyapong, et al [5], where (33%) of respondents reported returning to the messages more than once, with no gender differences observed. This is consistent with the Bendsten & Bendsten study that reported no differences based on gender, regarding students' satisfaction with the texting service for alcohol use disorder [14]. Consistent with observations in the study by Agyapong, et al [5], the majority of our respondents (88.3%) reported they reflect or take positive actions after reading the messages, and we believe this could be attributed to the reported positive impact of the program on respondents.

Regarding anticipated agreement with the provision of diverse technology-based medical services, our respondents generally praised the use of these services during COVID-19 and other similar crises. Compared to proposed technology-based medical services, our results showed that text messaging was most highly accepted, with an overall agreement of 87.8%. This could be explained by the simple nature of such programs to the end-users, who usually own cell phones, and the short and easy to read nature of the daily text messages.

Our study demonstrated slightly lower levels of acceptance for video consultation services for both mental and physical health, compared to the web-based counselling services. This may be attributed to the lack of required physical interaction in such services, where the one-way nature provided in

the web-based counselling services are usually more acceptable and welcomed [40]. However, when therapeutic interaction is required, face-to-face services could be preferred, especially in the time of global crises, due to privacy concerns related to therapy in the context of web communication [41]. Additionally, the physical presence of the therapist could play a therapeutic role and promote more interaction, subsequently improving resilience and overall psychological outcomes, especially on a long-term basis [39].

The present study has several limitations. First, there was a low response rate (9.1%) among the six-week subscribers, which may be due to the incentive-free and the optional nature of the survey. Thus, the reported levels of satisfaction may be skewed if there is a systematic difference in the features we measured, between responders and non-responders. Notwithstanding the low response rate, our sample size exceeded the sample size of 1775 respondents needed to estimate satisfaction rates for the entire subscriber population with a 3 % margin of error and 99% confidence. Consequently, our study was sufficiently powered to provide satisfaction rate estimates for the entire population of Text4Hope subscribers. Furthermore, Text4Hope has achieved a higher retention rate in comparison to other mental health apps targeting anxiety, depression, or emotional well-being [18, 34]. The high retention rate potentially reflects Text4Hope user satisfaction which may not be captured through surveys for which completion may be time-consuming for some subscribers.

Second, it is possible we achieved high satisfaction because people who like technology may be drawn to enrolling in the Text4Hope program. Third, there is potential for social desirability bias, which may have resulted in respondents reporting higher satisfaction and better perceived benefits from receiving text messages, although this is unlikely due to the anonymous nature of the survey.

There are several other possible limitations. It is possible that our finding that texting is the most accepted mode of delivery of technology-based health services could be biased, as those who like text messaging are likely to sign up for Text4Hope and therefore participate in the survey. It would be ideal to include a control group against which to compare anticipated receptivity to technology-based medical services expressed by the Text4Hope subscribers. Also, although there was a statistically significant gender difference between male and female gender in the overall satisfaction, the magnitude of the difference was very small and unlikely to be practically meaningful, especially based on the imbalance of gender identity sub-sample sizes. Similarly, our study population is skewed towards the female gender which is not representative of the population in Alberta or Canada. Finally, respondent feedback regarding coping with psychiatric conditions was self-assessed and without a corroborated clinical assessment.

In conclusion, our results indicate that texting-based programs are acceptable to end users with high overall satisfaction demonstrated by all gender-identities, although those of female gender had a slight significantly higher satisfaction compared to male gender subscribers. Our respondents affirmed the high quality of the text messages with their consistent reading and rereading of the messages and positive feedback regarding the message's supportive nature. Text-based mental health support services can be easily deployed during pandemics to support at-risk populations and alleviate the negative mental health impacts that are well-documented during uncertain times. Based on Text4Hope subscriber feedback, text-based support interventions using messages with an up to 160-character limit, written by health professionals and delivered daily can result in high levels of acceptance and satisfaction upon implementation.

Conflict of interest Disclosure: None reported

Authors contribution: VIOA conceived and designed the study, including the Text4Hope program with MH. RS drafted the initial manuscript with VIOA. AG, WV, and SS participated in data collection. All authors contributed to study design, revised and approved the final draft of the manuscript.

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Supplementary Files

Figures

Subscriber Flowchart.